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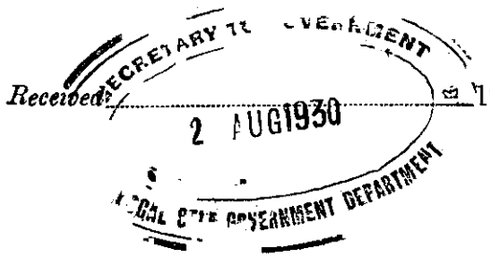
[Despatch Abstract.]

Malaria - South Kanara District - Report on malaria survey - Orders [illegible].

C.F. 80.

Public Health **DEPARTMENT.**



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Subject.

Malaria survey report - South Kanara District.

ENCLOSURES.
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R. No27[illegible]-1/Mal.

Station Madras , *Dated the* 31st July 1930.

From (Name) Captain N.R. Ubhaya D.P.H.,
(Designation) Ag. Director of Public Health, Madras.

To The Secretary to the Government of Madras,
Local Self-Government (Public Health) Department.

Sir,

I have the honour to forward the very interesting and illuminating report of the Special Malaria Officer on the malaria survey in South Kanara district. As the Special Malaria Officer himself says in para 28, this report should be read along with that on malaria survey in Puttur taluk forwarded to Government with my letter R.No.39-2/Mal. dated 1st March 1929. In para 24, the difficulties for thoroughly tackling the malaria problem on account of the difficulties of the natural physiographical feature are succinctly dealt with. But there is no reason to be pessimistic and one can with confidence carry out adequate relief measures, if only the Malaria Officer's recommendations made in paras 26 and

27 can be given effect to. Towards this end, I consider that it would be advisable for the President, District Board to call for a conference to which the Presidents of the Several Taluk Boards, and if necessary, the Special Malaria Officer should be invited and the whole subject discussed in all its aspects, so that adequate antimalarial measures may be inaugurated at an early date.

I have the honour to be,

Sir,

Your most obedient servant,

Capt., D.P.H.,
Ag.Director of Public Health,
Madras.

PRR.
31-7.

Report on malaria survey of South Kanara District.

(11)

While conducting a malaria survey in Puttur taluk, South Kanara district in December 1928 in pursuance of G.O.No.2353 P.H. dated 7th November 1928, it was represented that the season of annual maximum prevalence of malaria in several parts was sometime between April and June. It was therefore considered best to postpone the further investigation of the problem in other taluks to be taken up during that part of the year. Further, orders of Government on this subject having been received in June last (vide G.O.No.1427 P.H. dated 7th June 1929), the enquiry was taken up from April 8th and an itinerary was arranged in consultation with the District Health Officer.

2. The main physical features, climate, rainfall, people and their social and economic status and their literacy have all been elaborately dealt with as a whole in the report on the malaria survey of Puttur taluk. The observations made therein apply to the other taluks equally as well, with this possible exception, namely, that they are neither as hilly, nor abound in such thick and dense forests as in Puttur taluk.

It would however not be inopportune to recapitulate some of the most prominent features noticeable in the areas under investigation.

3. The district of South Kanara is the most northerly of the districts belonging to the Presidency which occupy the western portion of the Indian peninsula. It is a long narrow strip of country which consists of a broken low plateau or table land spreading from the foot of the Western Ghats with their stately cliffs to the sea on the west. The Ghats demarcate the eastern boundary separating it from the Mysore state and the Coorg Province, while on the north and south lie the district of North Canara (Bombay Presidency) and Malabar respectively.

4. The length from north to south is about 150 miles but the width, west to east, varies from 50 or 60 miles at its broadest part in the south to barely 6 or 8 miles at its northernmost limit. Roughly speaking the district has the shape of an irregular triangle, the base line being formed by an imaginary line drawn from a point in the extreme south on the sea coast and passing across the taluks of Kasaragod and Puttur to a cor-

responding point in the Ghats; and the sides of the triangle are formed by the coast line on the west and the ranges of western ghats on the east and the two extending in a manner as though they approximate together at some point in the north. But in reality, the extreme northern boundary consists of a narrow strip of undulating ground and low hills between the sea and the foot of the Ghats, barely 6 to 8 miles in width.

5. For administrative purposes, the district is divided into 6 taluks, of which, considered from north to south, the three taluks of Coondapoor, Karkal and Puttur may be taken as the eastern or ghauty taluks while the other three VIZ., Udipi, Mangalore and Kasaragod, as the coastal taluks. The northernmost part of Coondapoor and the southernmost area of Kasaragod taluk extend however into the sea on the west and the Ghats on the east.

6. The situation and arrangement of the Ghats are of considerable importance for our purpose. "Speaking broadly, the eastern boundary of the district is either the watershed or the scarf edge of the Western Ghats of which the peaks vary from 3,000 to 6,000 feet in height." Coming from north to south, the range on its western side assumes generally the form of precipituous cliffs as far as the Bangadi valley. But to the south of this where the range is futther from the sea, it consists more of parallel ridges intersected by the deep valleys from which the most important of the Canara rivers take their origin. Consequently the northern-three-fifths of the district are very much better drained and contain few or less significant natural springs or outcrops of water and seepages than the southern 2/5ths. Thus during the time of our visit except for the really big streams almost all the water courses were dry and streamlets of perennial nature were conspicuous by their absence.

7. Of the important rivers in the south, reference has been made to the Netravati, the Kumaradhari and the Payaswani in the report on malaria in Puttur taluk. In the northern parts, the rivers of any importance are the Kolluru with its tributary, the Chakranadi, the Haladi or Gurget, the Sitanadi and the Gurpur or Phalguni. The majority of these lie in the Coondapoor taluk and traverse through parts of Udipi taluk before they reach the sea - but as the Western Ghats are in the former taluk no where more than 25 miles from the sea

the length that these rivers traverse is very short; but during the monsoon months the quantity of water brought down is by no means inconsiderable. They also form large backwaters in conjunction with the sea; and, influenced by the tide for several miles inland, they are navigable to lengths varying from 12 to 15 or 17 miles from their mouths. But, in contrast, there are numerous smaller streams which drain rapidly into one or other of the rivers and are designated "holes". They dry up almost completely during summer, but provide ideal breeding places for anopheles mosquitoes very soon after the rains. These more than the bigger rivers, have, therefore, to be incriminated as contributing towards the spread of malaria in the villages lying in their proximity.

6. Due largely to these rivers and their estuaries giving rise to numerous creeks and bays, the coastal line offers quite a different picture to the interior Ghat regions. The coast line is low and sandy with broken or rugged rocks rising up here and there but the country near the sea board is well planted with cocoanut trees. Thus 'to a ship sailing past the shore presents an ever varying outline, generally a dark serried belt of cocoanut groves' and picturesque foliage and bananas, 'divided at frequent intervals by the gleaming mouths of broad rivers.' "Blessed with an abundant rainfall which, coming from the south-west monsoon, deluges for four months in the year all this region and steeps the earth and air in moisture, the district abounds with foliage and chequers the surface with green which assumes dense proportions into impenetrable forests as one goes eastwards towards the Ghats." Fortunately enough, no swamps are left behind and the backwaters and the estuaries, for several miles upwards consist of broad clear sheets of water which are continually played upon by the sea tides and by the winds. Water for irrigating the cocoanut or other groves and the intercepting small rice fields is obtained from wells or from excavations from the ground surface touching the subsoil water level. These are more often slightly brackish, muddy and not of much significance from the malarial standpoint.

7. Traversing now from the coast line towards the plains, one may meet with a sudden deep ravine which widens out into a winding

way and later joins a broad valley. The sides of the craggy rims are dotted with the cashewnut trees "loaded in the hot season with the large red and yellow apples from the end of which the edible nut curiously projects." Lower down probably one meets with close-set cocoanut or arecanut plantations, while on the sides are a variety of trees and creepers like pepper. Between the palm groves and under cliffs of the shallow ravine, rice plots begin to occupy the level centre, which, beginning as one at the top of the ravine, broaden out into 2 or 3 and more side by side as the area broadens, till at last a pleasant green stretches out 100 to 200 yards across. Being the natural channels for surface drainage they catch all the rain water which is bunded at conveneint spots in the upper slopes and diverted to fields lower down as required. Water from numerous springs, which often issue from the head of the ravine is utilised for the same purpose; but they generally go mostly dry during the summer months in parts of the district except in Puttur and perhaps slightly in Karkal taluks.

10. As in Puttur taluk, agriculture is the mainstay of the people. Rice is the staple article of food. There are no irrigation works anywhere, as the abundant rainfall suffices for the most part. The streams however are not so much used for irrigation purposes as in Puttur taluk Three crops are not ~~xxxxxxx~~ unusual in some places where there is plenty of water. But as one travels through the country side from south to north, agricultural produce is often limited but to a single crop; and one inevitably feels the poor economic condition of the peasant compared with his brother in Puttur taluk.

11. As in Puttur taluk again, there are, except for the bigger towns, no definitely demarcated village sites containing packed houses and bazaars. The rice tracts and the arecanut and the cocoanut groves stretch out more or less in contiguity and the homesteads of the owners and their labourers lie scattered under their grateful shade. Housing conditions are all alike over the entire district. Local administration is carried on by their respective Taluk Boards. Mangalore, the District headquarters, is the only municipalised town and Karkala, the solitary Union. Such big and flourishing towns as Coondapoor, Udipi, Kasaragod and Mulki, having each a population of 10,000 or more, have not yet been made into Unions even. The sani-

tary and other needs for "civilised social life" of the people in such an important pilgrim centre as Udipi with its teeming pilgrim who daily go in and go out have to be met from the revenues raised from other sources and in far off places.

12. Malaria survey: It should be mentioned at the outset that the months of April and May were elected as the best time for a malaria survey on account of the information gathered when in Puttur last that that period coincided with the season of maximum fever. To our great surprise and perhaps a certain amount of disappointment, it was found that the malaria season had not set in anywhere in the 5 taluks other than Puttur visited by us and we were everywhere told that the malaria season had to set in only hereafter, that is, soon after the first showers of rains and that it would continue more or less unabated till about the end of December or January. One may therefore say that the survey was in a restricted sense conducted under adverse conditions. Most of the streams were entirely dried up and thus a true picture of the full mosquito fauna which one would hope to recover during the febrile season could not be obtained. Most of the schools were closed and it was somewhat difficult to get and collect children for examination. In the smaller villages especially, one had to travel some miles before one could see a dozen children due to the situation of the houses remote from each other. Nevertheless no pains were spared either for inspection and collecting anopheles larvae from the many streams and rivers or for gathering and examining children for spleen and their blood for malaria parasites.

13. At each place visited, the nearest stream within a radius of one half to a mile was examined for the presence of anopheles larvae. Generally speaking, these larvae were found in very sparse numbers requiring repeated and prolonged search for them in the majority of instances. The number of species found were not many either. A. jamesi was found to breed ubiquitously in every water course or pool whether in the bed of a river or a small stream, seepage or even a well. Next in frequency were A. karwari, A. culicifacies and A. minimus var. varuna in that order as in the case of Haladi river, or Kollur stream or again in the stream at Kamalashile. Few specimen of A. pallidus were found in a few pools here and there. A. barbirostris was re-

covered from shaded pools containing plenty of weeds or decaying roots and leaves as in Kollur stream. Large numbers of A. jamesi were found in the Payaswani near Addor in Kasaragod taluk and again in Mundaje stream and in the Netravati river in Puttur taluk where they were not obtained in December 1928.

14. The muddy pools and ditches in the road sides in Baindur and the excavation pit and pools in the midst of cocoanut gardens round about Coondapoor and Udipi gave only A. subpictus which was also found in a few pools in the bed of the Netravati near Kalmanje in Puttur taluk. In two wells at Udipi, a few larvae of A. minimus var. varuna were found. Thus the species of anopheles mosquitoes found in the area under investigation during the months of April and May last are A. jamesi, A. karwari, A. culicifacies, A. minimus var. varuna, A. subpictus, A. pallidus and A. barbirostris in descending order of frequency. Of these species, A. culicifacies is a well-known and effective carrier of malaria.

15. Examination of children and their blood smears: 3,538 children between the ages of 2 and 12 were examined in the whole of the area traversed by us, out of whom 323 showed evidences of enlarged spleen. This works out to a spleen rate of 9 % which is very low as compared with that obtained in Puttur taluk. On a superficial glance, one would conclude that the problem of malaria in South Kanara district other than in Puttur taluk is negligible. Closer scrutiny however shows that as in Puttur there are places with varying degrees of malaria from a high endemicity to a low endemicity or even a total absence of it. Thus some places like Kamalashile, Kollur, Hosangadi, Kervashe are very highly malarious, whereas the coastal towns and villages are all of them free from indigenous malaria. In between malaria occurs to a varying degree.

16. Out of 506 blood smears taken by random sampling, only 38 were found to contain one or other varieties of the malaria parasite. Benign Tertian and Malignant Tertian appeared in almost equal numbers while quartan type was found to occur in areas which were more hilly and which were clad with large forests.

17. It is desirable to make at this stage a brief reference to each of the places visited by us:

(1) Karkala, the first town that was visited is a Union of about 8,500 people and is situated 35 miles to the north-east of Mangalore.

It is a fairly important place commercially and is the headquarters of a District Munsiff and Tahsildar. There is an Assistant Surgeon in charge of the hospital. There are half a dozen elementary schools and one High School. The town proper lies almost on a level bit of country. To the east are seen the magnificent Western Ghats with their green slopes. At the eastern end of the town is situated, the pretty lake of Ramasamudram which is formed by putting a dam across the line of natural flow of what was once a stream. The big rock with a huge Jain sthupa overlooks it at the south-west end. By the side of the Ramasamudram lake is another calle d the lotus lake. Lying to the east of the road to Mangalore are two tanks called Sigidikere and Anekere which are rain-fed. The water from them is led ~~soon~~ by a culvert across the road to the paddy field to the west of the road. The edges of the water were fully covered with moss and algae, in the midst of which larvae of A. jamesi were found in shoals, intermingled with a few of A. pallidus.

Except to the west where it is more or less open, the country side is dotted with small hillocks. The margins of the Ramasamudram lake at some portions are overgrown with weeds where a few anopheles larvae of A. jamesi and A. karwari were found.

The Thallar river flows about one mile to the south of the town. Some larvae were collected here in the numerous pools which proved to be A. jamesi and a few of A. culicifacies and A. karwari.

Of the 590 children examined, only 6 had enlarged spleen giving a spleen rate of 1%. 33 smears were examined of which none was found infected.

The following ~~in~~ villages in this taluk were also visited:

(ii) Durga, a small village about 6 miles to the north-east of Karkala, lies in the midst of a cluster of 3 small hills.-- On their lower slopes and in the valley between are large groves of cocoanut and arecanut. The hill sream is bunded at a site to the east of the temple and water diverted to the gardens and fields. Young larvae of anopheles mosquito were found in small numbers. Out of 32 children examined 11 showed enlarged spleen. Quinine tablets are given to the school-master and the Patel for

free distribution.

(iv) Kervashe- about 3 miles further east close at the foot of the Western Ghats. Except for the Thallar river which flows on the south and then south-west and separates it from Durga village, no other streams or seepages were encountered. There is a Mission School and the teacher reports that the place is highly malarious. 7 out of 21 children had their spleens enlarged. During 1929, there were 44 deaths as against 39 births.

(v) Miyar is also a small village with a bazaar, about 3 miles east of Karkala. It has a stream close to the village on the east and larvae of A. jamesi were found in small numbers in the pools thereof. Otherwise the place was quite dry. Only 5 out of 72 children had evidences of enlarged spleen. 21 smears were examined and only one smear showed a few malignant tertian parasites.

(vi) Mala is a village about 8 miles directly east of Karkala near the foot of the Ghats. There are about 300 houses. Mala river flows about half a mile to the west of the village. Plenty of anopheles larvae were collected in the pools found here which turned out to be A. culicifacies. There were clear evidences of malaria in the village.

22 children were examined and 13 of them had enlarged spleen giving a spleen rate of 54%. But 8 adults of whom five had been to the Coorg plantations were examined and all of them had enlarged spleen: but their blood smears gave a negative result.

(vii) Nellikar, another village about 8 miles to the south of Mala was found to be quite healthy. The village is in an open country like Miyar and the distance to the foot of the Ghats is about 8 miles. No streams were found in the vicinity. Of the 31 children examined, only one had enlarged spleen giving a spleen rate of 3%. Of the 15 smears examined, none gave a positive result.

(viii) Ajekar - a big sized village. It has two streams one on the east and another south-east each about a mile and a half from the centre of the village. Fevers were reported to be generally prevalent only after the rains. There is a school and the Headmaster distributes the quinine, the demand for which being great. People appreciate it very much and consider the free quinine scheme a blessing. On the south is an elevated ridge and natural drainage is very efficient. 70 children were examined but the spleen was found

enlarged only in 5 of them. 21 blood smears were examined, but only one was found infected with quartan parasite.(gamete forms).

(viii) Muniyal - a village on road side about 3 miles north of Ajekar is about 4 miles from the Ghats but within a furlong of the east and south, it is bounded by dense forest. Here also is a Board Elementary School where 47 children were examined and 11 had their spleen enlarged. The teachers and children were curious to know something about the mqsquitoes and a demonstration with the help of the microscope was given. 18 blood smears were taken and examined. 3 of them contained bening tertian parasites and one of them showed a heavy infection.

(ix) Mutlapadi about 3 miles to the east between Muniyal and the Ghats. Here was found a typical small stream winding round the village on 3 sides from which water is diverted to the fields lying in the flat low ground in the valley. The village also has thick reserve forests all round. There was considerable difficulty in getting children. Only 12 children were examined, but 8 of them had enlarged spleen: but none of the smears examined was found infected. It would appear that many of the children coming to the Muniyal school come from this village and it would, as such, be more appropriate to group the figures of spleen and blood examination together for arriving at a correct picture.

Thus No. of children examined in both for enlarged spleen.	59
No. with enlarged spleen.	19
No. of blood smears examined.	27
No. infected.	3

A good number of anopheles larvae of A. jamesi and A. culicifacies were found in the stream. Quinine is distributed by the village munsiff who had however not yet replenished his stock. Fevers were reported to be prevalent in November to January after the end of the south-west monsoon rains.

(x) Mudradi is a pretty big village extending 7 miles north and south and 4 miles east and west. It has a stream about 3/4 mile to the south which skirts round the village on the west in which larvae of A. jamesi and A. karwari were found in large numbers. It also possesses a good Board Elementary School and the Headmaster and his assistants were kind enough to collect the children at the school, although it was a holiday. 52 children

were examined and the spleen was found enlarged in 12 of them. 30 blood smears were examined, but none was found infected.

(xi) Hebri, an important village on the road to Udipi from Somashwar. It lies at the northern slope of a triangular ridge of hill which separates Mudradi on the south and Sitanadi village on the east, these three villages lying as it were at the three ~~apical~~ corner points of a triangle. The main village is in open country with very little evidence of malaria, and 15 out of the 16 cases with enlarged spleen were amongst those living in the interior in the midst of fields and forest. Out of 25 children in Hebri bazaar, only one had the spleen enlarged. On the whole 59 children were examined and 16 showed the spleen enlarged.--only one blood smear from a child suffering from fever showed presence Malignant Tertian rings in large number out of a total of 31 smears examined. Two smears from adults with a large-spleen which filled the whole belley were found to be negative.

(xii) Somaswar: close at the foot of the Agumbi ghat - lies in the important road of communication between Mysore territory and South Knara. There is heavy traffic of men and materials here all the year round, and very often travellers have to halt for an overnight. The nearest water courses namely Sitanadi and a small stream one on the south-west and the other on north-west were nowhere nearer than a mile and a half from the village. Otherwise the countryside was quite dry and people experienced considerable difficulty for water. The village has extensive forests all round. 19 out of 35 children examined showed the spleen enlarged, nevertheless not one out of 33 smears examined was found to contain malaria parasites. Quinine seems to have been very popular and almost all the children confess to have taken it occasionally during the fever season which was reported to be between November and January. But for more effective use, it is desirable to leave it with the School-master than with the Patel who lives some six miles away from the place.

(xiii) Coondapoor, a port due north about 60 miles from Mangalore, was next examined. It is for its size and importance a small place of 5,000 people. It is noted for its healthy and salubrious climate. There are a High School and 3 or 4 elementary schools which were also however closed at the time of inspection. It is also the head-quarters of the Sub-Collector, District Munsiff and Tahsildar.

There is an Assistant Surgeon in the station.

Gangolly river flows close to the town. The mosquito breeding places that occur here are restricted to the large ponds dug out in the cocoanut plantations for watering the trees. Most of these were teeming with anopheles larvae, all of which proved to be A. ~~xxxxxxxxx~~ subpictus Coondapoor is malaria free and the large number of cases in the return of the local hospital is evidently due to people who come from outside mainly to make purchases at the weekly fairs, and who incidentally attend hospital for a recipe for their ailments.

Of the 28 children examined, ~~only~~ ~~more~~ had enlarged spleen, ~~giving a spleen rate of ... %.~~ No smears were taken.

(XIV) Haladi: a big sized village lying on the left bank of a large stream called Haladi or Gurget river. A large number of anopheles larvae were collected from pools in both the streams which bred out into A. jamesi, A. karwari, A. culicifacies and A. minimus (varuna).

No. of children examined for spleen.	60
No. with enlarged spleen.	4
No. of blood smears examined.	15
No. infected.	4 -- M.T.2. B.T.1. Q.1.

All the positive smears were from children who showed an enlarged spleen and who complained of recent fever. The Patel said that fevers were more prevalent in Kunigar and Mudravalli situated 4 to 5 miles north-east of Haladi.

(XV) Sankaranarayana, a village of some importance due to its situation at the junction of roads to Coondapoor, Souda and to Hosangadi. It has a rural dispensary and the general opinion is that the place is malarious and the daily average attendance at dispensary is about 30 of whom nearly 25 or 26 come for fever. The Collector of the district has supplied a small quantity of quinine out of his discretionary grant, but it is insufficient for general use. Souda, a hamlet about 2 miles westwards lies on the river Haladi and is reported to be more malarious. 58 children were examined and only 6 of them had enlarged spleen. 18 smears were taken and 3 of them were found infected (1 M.T. 1 Q. 1 B.T.).

(XVI) Siddapur, about 5 miles to the north-east of Sankaranarayana, is in a low flat valley with forest on at least 3 sides. A small

stream runs about 3/4 mile to the east, but it had gone dry. The Patel was able to gather a large number of children at short notice. 64 children were examined, 3 were found infected and of these two smears ~~two smears~~ were from children who had an attack of fever.

(XVII) Ajri and Kamalashile :- 2 small villages more or less contiguous about 5 and 6 miles directly north of Siddapur. The importance of Kamalashile is due to the temple of Durga Bhavanai which is held in great sanctity and people come from distant parts in the Shimoga district in Mysore state. The place is surrounded by hill and forest and has a small perennial stream running a winding course along the south and west skirting the wall of the temple. This place has close resemblance to Subramania in Puttur taluk and is highly malarious too. The village munsiff pleaded for the free supply of quinine as the grant of 40 packets of 10 grs. each by the Collector was a mere drop in the Ocean. He is sure that even this quantity had been so effective as to reduce the fever mortality during 1929-30 from 33 to only 13. Larvae of A. culicifacies were particularly predominant in the pools of the stream. Few specimens of A. jamesi and A. karwari were also found. 45 children were examined and as many as 27 had their spleens enlarged. 27 smears were examined. 2 of them were found infected. (1 Q. and 1 B.T.). The annual festival was in full swing at the time of my visit, and advantage was taken of it to examine some of the children amongst the 25 families who had come down from a place called Nagara in Mysore state. 10 out of 14 children showed enlarged spleen. The blood smears of an adult who complained of fever and who had a large sized spleen contained malignant tertian parasites. The importance of this lies in the fact that these temporary migrants may act as efficient carriers by infecting the local anopheles mosquitoes.

(XVIII) Hosangadi: once a big village now in gradual decay lies about 5 miles east of Siddapur, close to the foot of the hill on the way to Hulikal ghat leading to Sagar in Shimoga district. The place is very hilly and covered with forests on all sides. It has a tank to the north in which larvae of A. jamesi were found in large numbers. Otherwise the surrounding country side was quite dry. 25 children were examined and 16 of them had enlarged spleen. No. of smears examined - 21. No. infected. 2. (1 M.T & 1 B.T.).

(xix) Ganguli, on the right bank of the backwaters at Coondapoor, is a place of commercial importance and has a flourishing export trade in fish and cocoanut. It is a coastal village built on a sandy soil exactly like Coondapoor. A local industry is the making of small boats and rafts for the transport of human beings and light cargo. 146 children in the local school conducted by private management were examined and no case of enlarged spleen was found.

(xx) Baindur, about 15 miles north of Ganguli consists of Baindur, Yedatore and Munyadi all the three being contiguous with one another. These villages are on flat country on the sandy coastal plain and the Kollur river skirts it on the east and south. During rainy months and high tides, the country is flooded with salt water.

	No. of children examined for enlarged spleen.	No. with enlarged spleen.	Spleen rate	No. of smears examined.	Number infected.	Parasite Index
Baindur (Yedatore)	123	8	6%	15	1	7%.
Munyadi.	51	1	2%.			

Rice is cultivated largely during and after rainy months.

While passing to Kollur village, it was represented that the fever stricken villages commence from about 3 miles east of Munyadi where the village of Elyjit is situated. A spleen census of children at this end at Golihalli 5 miles further east was taken. 7 out of 17 children at the former place and 4 out of 9 at the latter place had the spleen enlarged.

(xxi) Kolluru about 1,500 to 1,700 ft. above sea level lies in a shallow cup surrounded by low hills at the foot of the tall cliffs of the Western Ghats. There is a temple of great sanctity to which people from Malabar, especially flock in great numbers. The Kolluru stream winds round the village on north and west and another small one on the east.

Comparatively speaking, more water was found here that at any other place. It was once an important place, but now has only 60 or 70 tenements with a population of about 400. The village munsiff who is a well-to-do orthodox person informed me that the fever season is between March and May. 20 out of 28 children had enlarged spleen. A visit was paid to an inland hamlet in

the midst of forest and forest streams called Mavinkere to examine a tribe of local origin called Kudbis. Only 6 children were available for examination and 4 of them had the spleen enlarged. 28 smears were examined at Kollur and 3 smears were found infected. One of the 6 smears among the Kudbis was found to contain quartan parasite. This hamlet has a perennial spring coming from the top of the ravine on the west.

(XXII) Basrur, a village about 4 miles to the east of Coondapoor on the right bank of the Gangoli river was found to be quite free from malaria. At one time Basrur was quite an important place and fairly big sized, trading vessels used to come right up to the place. But latterly it has sunk into insignificance and now has a population of only about 2,000. Besides the river which is subject to tidal influence, the only other water places are the 3 large bathing tanks in connection with certain local temples, which were however quite free from anopheles larvae. Of the 188 children examined, only one had enlarged spleen giving a spleen rate of 0.5%. No smears were taken at this place also.

(XXIII) Wondse, Karkunje and Chittur, a group of 3 villages about 9 miles from Coondapoor, also eastwards, were next examined. Of these Chittoor was found to be the worst infected and Karkunje the least. The reasons appear to be that there are 1 or 2 holes or small streams close to Chittur village which is a good source of A. culicifacies. Karkunje on the other hand lies on higher elevation and there are no streams or other breeding places closeby.

The following are the figures for the spleen and blood examination:

	No. of children examined for enlarged spleen.	No. with enlarged spleen.	No. of smears examined.	Number infected.
Wondse.	17	5	9	..
Karkunje.	33	2		
Chittur.	31	14	21	2

(XXIV) Udipi, the next place that was examined is the second biggest town in the district and yet strange to say it is neither a municipality nor a Union, though there is a population of 11,882. Local administration is by the Taluk Board. The name of Udipi is given to the conjoint group of 5 villages which have been brought under a single administration. The earlier it is constituted into a municipality, the better

it is for the local health administration and if necessary Malpi and Kalmadi could be included in the area. It is the headquarters of the District Munsiff and the Tahsildar. There is an Assistant Surgeon at the station. It is a great place of pilgrimage. Malpi about 3 miles to the west is a rising port. If the idea of extending the railway to Udipi from Mangalore materialises, its importance will be all the greater. Only a few larvae of A. subpictus were found in this town in a couple of wells. No other anopheles larvae could be found any-where, the place having little or no stagnantion of water. Of the 696 children examined 1 had enlarged spleen. No smears were taken at this place.

(xxv) Haladi contiguous with Haladi which lies within Coondapoor taluk. The Haladi river and the stream which is a tibutary of this river are closely adjacent to the north and east respectively. 9 out of 47 children had enlarged spleen. 18 smears were examined and none was found infected.

(xxvi) Kalmadi and Malpi, contiguous with each other on the coastal line. The Udayavara river joins the sea closeby on the south. The natureof the country is exactly like Ganguli. 65 children were examined but with a negative result. Few larvae of A. subpictus were collected from the pits in cocoanut groves.

(xxvii) Kote and Katpadi (Yenagudda village). These are two coastal villages on the road to Mangalore. The sea is about 2 to 2½ miles west of Katpadi and Kote lies somewhat midway between the two. 54 children were examined in Kote and the one boy who had an enlarged spleen stated that he had been to the hills. The panchamas from the interior of Udipi taluk migrate annually to the coffee estates in Mysore territory for labour and returns to their homes in time for the agricultural operations. In Katpadi, there is an excellent aided school started by private enterprise. 65 children were examined, but none had an enlarged spleen.

(xxviii) Karaji (Hosur), a village with scattered households situated on the road to Somaswar about 16 miles from Udipi is typical of a rural village in South Kanara; and consists of alternating ridges and valleys in which rice is grown. The rain water that falls in the area is conserved for agricultural purposes, by means of channels specially made. Water keeps running in these channels for nearly 9 months in the year. 62 children coming from the

neighbouring villages within a radius of 3 to 4 miles namely Holavalli, Cherkadi, Kinjur and Nalkur which were all reported to be malarious were examined. The parent village Hosur itself is said to be more malarious. A 62 children were examined and 15 of them had the enlarged spleen. 31 smears were examined and 5 of them were found infected. Fever in 4 cases was due to maligant tertian parasite.

(xxix) Perduru, Byrampalli and Bellarapadi were the next group of villages inspected. Perduru is a big village with a big temple and bazaar about 12 miles from Udipi on the road to Hebri via. Hiriadka. The latter villages are in the interior. The Puttige hole runs in the midst of these villages. Perudur has a rural dispensary and fever seems to be more prevalent in the outskirts than in the village centre itself as 80% of cases were told to be of malarial origin. The following statement gives results of spleen and blood examination:

	No. examined for enlarged spleen.	No. with enlarged spleen.	Spleen rate.	No. of smears taken.	Number infected.	Parasite rate.
Perduru.	87	12	13.9%.	29	1	3.7%.
Byrampalli	57*	7	12.2%.	12	..	*36 children were from the local school of whom only 2 had enlarged spleen.
Bellarapadi.	18	3	16.6%.	6	1	16.6%

Larvae of A. jamesi, A. culicifacies and A. minimus were obtained from larval collection from the Puttige stream closeby.

(xxx) **Bantval.** In Mangalore taluk, Bantval was the only village inspected. It lies on the banks of the Netravati about 17 miles due east of Mangalore. It is a small village of 4,642 inhabitants and consists of a tiny stretch of land wedged in between the Netravati on the eastern side and a small hill stream on the western side. On account of its peculiar situation, it is frequently visited with floods and any sudden rise in the river during the monsoons gives cause for serious alarm. The feeder stream takes its origin at the foot of the hills some 3 miles away from the town. During summer the ryots dig a channel in its bed and divert the water for purposes of irrigation. Plenty of anopheles larvae were found in this channel. The Netravati as it approaches Bantval spreads over an expansive ~~land~~ bed overlaid with small rocks and boulders. Hence innumerable pools are formed here and there in which plenty of anopheles larvae breed. The larvae that were bred out were chiefly of A. subpictus and few of A. culicifacies. The only

feasible thing here is periodical Paris greening of all the pools and the canal, for which an adequate staff may have to be provided.

The general opinion of the public here was that the fever season begins only from the middle of June. The hospital figures also fully bear out the facts. As the schools were all closed. it was very difficult to get children for examination. Of the 70 children examined, only 3 had slightly enlarged spleen. No blood smears could however be taken as there was considerable local opposition.

(xxxi) Adoor was the only village inspected in Kasaragod taluk as typical of the country between the coast and the taluk of Puttur. The south-eastern area of the taluk is very hilly with tall cliffs and precipituous slopes and is largely unapproachable.

Adoor lies about 20 miles slightly north-east of Kasaragod on the right bank of the Payaswani river. It has a rural dispensary and a Police Station. Across the village runs a small stream which rises in the upper slopes of the ravine and joins the Payaswani ultimately. The village has a handful of indigenous people belonging to the depressed class..

	No. of children examined for enlarged spleen.	No. with enlarged spleen.	Spleen rate.	No. of smears taken.	Number infected.	Rate
Caste Hindu & Muhammadans.	62	7	11 %.	16	1	6 %.
Panchamas.	18	7	39 %.	17	2	12 %.

The Panchamas annually migrate to the Coorg plantations and return in time for the agricultural season. Anopheles larvae collected in pools in the bed of the river bred out into A. jamesi, A. karwark, A. minimus and A. culicifacies.

(xxxii) In continuation of the tour, Mundaje in Puttur taluk was visited for the purpose of inspecting the nature of antimalarial work that was voluntarily undertaken on his estate by Mr. Bhide, a prominent landlord and member of Taluk Board. The District Health Officer during one of his tours had himself visited the village and directed the initial operations. The measures consisted in oiling the pools on the rocky bed of the Mundaje stream which passes abutting his garden lands and of ditching and draining the several other pools both in the river bed and the channels. Mr. Bhide Junior who, as Secretary of a local Welfare

Association conducted the work, has given me a report (copy enclosed as appendix) from which one can see how much good can come out of even small efforts made at comparatively small cost. These enthusiastic workers have succeeded in making quinine quite popular in the area and I personally witnessed during the course of my 2½ days' stay that the demand for it was very certainly encouraging. The pity has been that little or no financial or other co-operative assistance could be had either from the other well-to-do landlords or from the local or the central authorities.

A visit was also paid to Nidigal which lies on the left bank of the Netravati river about 4 miles west of Mundaje. The school for this village is situated on the other side of the river in the Kalmanje village. 41 children coming to school both from Kalmanja and from Nidigal were examined. Only 9 had enlarged spleen. It seemed however that the village of Nidigal, although so close to Netravati, was not as badly affected as the hilly parts of Kalmanja.

18 Discussion. The results of spleen and fever survey may now be tabulated in one comprehensive statement for the purpose of studying their relative importance in trying to measure the extent of malaria prevalent in the several places visited.

(vide statements I and II). pp 28-29 infra

(In statement III the corresponding rates obtained in Puttur taluk are also given for enabling a comparative study). (Pages 44 5)
- (Statement contained in para 18 of Puttur report).

19. From these statements one can fairly conclude that except at some very hilly and forest ridden places such as Kolluru, or Mutlapadi or again Somaswar, malaria in general is not as bad or as highly endemic in the taluks investigated into as was found in Puttur taluk. It is to be noted that the low spleen rate may be due to the fact that the examination was conducted during what was obviously the off-season for malaria, despite reports received to the contrary.

20. This is evidenced by the equally very low parasite index in almost all the places visited--even where the splenic index was high. In Puttur taluk, however, where also the time of our visit in December was said to be the afebrile season, the parasite indices were, relatively speaking, high and although they were in direct correlation with the corresponding spleen rates, yet it is not unlikely that such a condition may have been due to the cold weather during which relapses due to exposure are not uncommon. Such doubtful or disturbing factors

may be well excluded from the present investigation which was conducted during the summer month of April when the temperature was rising from day to day and the heat was getting oppressive, the streams were dry or rapidly going dry and the natural springs had ceased to be active, and therefore the chances for the propogation of anopheles mosquitoes were at their lowest. The more important factor that would indicate the absence of active outburst of fevers is the absence or almost negligible presence of the carrier species of anopheles. As stated already the output of A.jamesi and next to it A. karwari were at a maximum in any water place which one could lay his hands upon: per contra, the propogation of A. culicifacies and next A. minimus were at the minimum.

21. For these reasons, it seems to me that both the spleen rates and the parasite indices go to represent the true state of malaria and give an almost correct amount of it as one would expect to find in places in which the disease either exists in varying degrees of endemicity or only breaks out annually during one or other of the seasons. It may also be argued that places which lie close at the foot of the hills or in small valleys and which are surrounded by forests are comparatively speaking most malarious: whereas those which were situated in open country and where the natural streams and springs of perennial nature are few or far between and the forest tracts sufficiently remote are the least malarious.

22. various natural and other circumstances---namely, the level country, the extensive sandy tract which rapidly absorbs all surface water, the innocuous nature of the rivers and their estuaries which come under tidal influence all the year round and the general absence of swamps, the daily average temperature which ordinarily is higher and more equable all the year round than that in the interior and the more hilly parts, last but not least important, the better economic condition of the people--- have been very largely responsible for rendering the entire coastal tract upto an average width of 5 miles inland almost free from malaria. But as one goes into the interior further east beyond this line, one encounters the smaller but perennial streams and natural seepages; and then one gets to recognise

the occurrence of fever. But, even here, it is significant that, relatively speaking, its incidence is much greater in villages which are in close proximity of such natural seepages and of natural forests than in those which are in open, well-drained country. This obviously is the explanation for the larger amount of fever in the outskirts of Hebri than Hebri town itself, or in Wondse than in Karkunje in Coondapoor taluk or again in Karaji (Hosur) and Bellarpadi than in Perduru Kasba village in Udipi taluk. It was also very characteristic that Haladi in Coondapoor taluk is more malarious than Haladi in Udipi taluk, although they are contiguous with each other and although the latter is almost wedged in between the big Haladi river and its tributary stream. This leads me to state that, judged as a whole, the bigger rivers like Haladi or Sitanadi or even Netravati with their expansive courses are less dangerous than the smaller streams and streamlets. For instance, Nidigal on the Netravati is least malarious as compared with Mala or Mutlapadi on their respective ~~hamlets~~ streamlets

23. For the same reasons, the incidence of malarial fevers shows a steady rise as one travels still further eastwards until it attains to a maximum at or in close proximity to the Ghats, so much so that the majority of the villages in the Ghat section where fevers are present almost throughout the year may be classed as hyper-endemic; and Kervashe, Somaswar and Kolluru may be quoted as instances. Nevertheless as already stated, fevers not only on the Ghat tracts, but also in other places are not so universal nor so severely endemic as in corresponding parts, in Puttur taluk. For one thing it seems to be that the physiographical and other natural features differ widely in the Karkal and Coondapoor taluks on the one hand and Puttur taluk on the other. For another thing the country side gets to have less and less of surface water due to the rapid escape of perennial streams and seepages as one goes from south to north. Consequently, taking the three eastern hilly taluks under consideration, malaria is most prevalent in Puttur taluk and least in Coondapoor, whereas in Karkal it occurs in moderate degrees. Also Puttur taluk has the largest number of villages which are less scattered and more closely situated than in the other taluks.

In Udipi taluk, the small strip of territory at its eastern end touching upon the Coondapoor taluk on the east and Karkal and Mangalore

taluks on the south is more malarious than the rest of it: and this tract again lies in a low valley through which runs numerous seepages and petty streams that come from the north-east or east.

No extensive survey was made in Mangalore and Asaragod taluks. With regard to the former the District Health Officer reported that fevers were prevalent to a moderate extent in the Netravati valley and quoted Bantval which was inspected. But the spleen rate of 2.8% there is quite negligible.

As for the latter, the District Health Officer was of opinion that the southeast tracts which are hilly and which have been sparsely populated with little or no channels of communication are distinctly malarious. It is most likely true as these tracts border the Sampaje ranges of hills and the Coorg territory. Adoor, as an example of the type of village in more open country, was inspected and malaria seems to be here moderately endemic.

Coming now to the recommendations that can be made, the investigator gets oppressed with feelings of almost despair and despondency, as to the exact measures that can be suggested and as to the extent to which they can be actually put into practicable and demonstrable effect. For as said in the Puttur report, the tangled problems of malaria in such difficult tracts of country containing several hyper-endemic areas cannot be unravelled in the course of a few weeks or month's observations; and after all, it is doubtful, whether, considering the extent of population to be benifitted at each affected village, its size and importance, any measure of permanent relief can be wrought except at very fabulous costs. The real crux of the situation is that there is not a single or isolated village on any specified area of land which can be exactly defined for applying suitable antimalarial measures. Each village is a long and wide strip of country over which lie series of huts scattered about in the midst of fields and groves or at the foot of hills, high or low, or again, in neighbouring low valleys, and which ultimately merges into the next one. For the newcomer, it would be impossible to discriminate the respective village boundaries and very often two rows of huts over the same field may belong to two different administrative village units.

25. The application of antimalarial measures of permanent utility would, in the strictest sense, mean the removal by various engineering devices of all surface water, whether in river, stream or seepage along the whole length and breadth in the affected areas extending over several miles --- a procedure impossible for ~~xxxxxx~~ obvious reasons in such a vast undulating country consisting of hill and dale, ravine and valley. The analogy often quoted, as ideals of perfection in the Federated Malay States would be practicable if one had to deal with limited and well-defined colonies of labourers, the majority of whom are on contract and under some form of disciplinary control.

26. It therefore seems to me that the remarks made in paras 52 in my report on malaria in Puttur taluk stand good and are equally applicable. The goal which one could aim at is not the complete eradication of malaria, which is ~~mere~~ a mere theory in such areas, but its control and mitigation. The general terms by which one can accomplish reaching this goal were also elaborated in that report; and they stand fully supported by observations made in the present investigation But considering the vast area of country under question and the complexities of the problem, the proper course would be to have a suitable organistion to adequately combat with it. Such an organication should, as I have ~~xxxxx~~ stated in my report on malaria in Anantapur district, be threefold in nature for assailing the enemy from all sides. First, the Central authority - to wit, the Government should provide the necessary trained personnel which should in the first instance consist of an Assistant Surgeon in place of a Sub-Assistant Surgeon which was recommended for Puttur taluk singly and 4 Inspectors distributed thus: One Inspector to be in charge of Puttur and Karkal taluks each: and the other two each in charge of the taluks of Coondapoor and Udipi; and Mangalore and Kasaragod. The Assistant Surgeon shall carry out more detailed investigations of places and actually inaugurate and supervise antimalarial operations and advise from time to time on their application. The Inspectors will conduct the works on the spot--the whole staff to work under the Director of Public Health through the Special Malaria Officer. For more detailed description of their functions, I would ~~advise~~ invite attention

to my report on Puttur and the more recent one on Anantapur district.

(2) Secondly, the District and Taluk Board should employ a reserve labour force consisting of 8 to 12 men for each Unit, to be supplemented as and when required. They should also provide the tools and larvicides as oil and Paris green.

(3) Thirdly, local landlords or ryots should co-operate with the authorities and lend a helping hand by giving the extra labour or paying for it in lieu.

27. Above all the more immediate measure of relief will be the extension of the scheme of free supply of quinine over the whole district. The use of quinine does not appear to be ~~nowhere~~ anywhere so popular as in this district and several examples of private munificence were brought to my notice now and before. The Collector of the District has himself addressed Government on this subject on more than one occasion and in the absence of favourable orders has himself supplied small quantities of quinine in certain parts of Coondapoor taluk out of his discretionary grant. Quinine shall have to be the sheet anchor in any scheme of malaria control for long, long years to come.

28. Summary: The salient features and the opinions expressed in this report should be read and considered side by side with those detailed in the report on Puttur taluk submitted to Government in letter No. 39-2/mal. 1329 from the Director of Public Health.

Firstly, in regard to the incidence of malaria the entire district of South Kanara may be broadly stated divided into three regions, west to east.

(a) The coastal-line and the sea-board along the whole length north to south and stretching in land east-wards to distances varying from a couple of miles at the extreme north to about 15 to 25 miles in the south -- the average being about 12 miles, in which indigenous malaria is almost absent.

(b) The tract of this country lying east of this line and extending to varying distances, from a couple of miles in the extreme north to 12 or 15 miles in the south, in which malaria is indigenous but increasing in magnitude as one passes east-wards and the disease is on the whole slightly or 'moderately' endemic.

(c) The belt of territory lying further eastwards of the above

two areas and including the submontane regions and the truly hilly areas with their dense forests reaching often the actual threshold of human tenaments and extending to about 4 or 5 miles at the extreme north to 10 to 12 miles on the south in which malaria is hyper-endemic with spleen rates approaching 70 per cent. or more.

(2) Coming from north to south, malaria occurs in increasing measure depending entirely upon the physical and other natural features of the country including the proximity of natural springs and the smaller perennial streams: and of forests to tenamented village areas, until at last its severity and extent reaches a maximum in south-eastern parts of Puttur and probably of Kasaragod taluks. In other respects, the conclusion arrived at already after the survey made in Puttur taluk hold good in general.

(3) Infection due to all the three forms of parasite is found distributed more or less equably over the district but that due to quartan parasite becomes more and more pronounced as one goes towards the more hilly and forest ridden areas.

(4) The peculiar physical features of the country make it very difficult to devise and adopt permanent antimal-rial measures unless at unimaginable costs.

(5) Very great reliance has therefore to be placed upon the clearing of low scrub and jungle and upon removing marginal vegetation, in the small streams, seepages and garden channels within a radius of at least 2 furlongs from inhabited areas all round, supplementing where necessary by oiling or Paris greening all stangnant pools of water, especially in the rock-pools in the beds of small streams in the vicinity.

(6) Special emphasis has to be laid on the beneficial advantages of quinine and its wholesale use and administration advocated, popularised and encouraged by all means. It would be worth a great deal to extend the scheme of free distribution of quinine andto observe its effects over one whole district at least. For this purpose, no district other than South Kanara can be elected as more suitable.

(7) Methods of personal prophylaxis by other means may be popularised as well wherever possible.

(8) To achieve the purpose of this investigation and report, a three-fold organisation as detailed in para -- above should be set up.

Without adequate technical advice, help and control from the Central authority, no tangible result can follow.

(9) More rural or other dispensaries in the interior villages should be opened.

29. I take this opportunity to thank the District Health Officer and his staff of Health Inspectors for all the assistance they rendered in this work of investigation.

V. Raghavendra
28 7.32

B.A.,M.B.C.M.,D.P.H.(Camb).,
Special Malaria Officer, Madras.

PRR.
23-7.

Appendix I.

Name of place.	No. of children examined for enlarged spleen.	No. with enlarged spleen. V_0	V_1	V_2	V_3	V_4	V_5	V_6	Spleen rate.	Average spleen.
Karkala.	584	578		4	2				1.0	.03
Mala	22	9		3	8	2			59.0	1.70
Nellikar.	31	30			1				3.2	.10
Durga.	32	21	7	1	2		1		32.0	.62
Kervashe.	21	14	5			2			33.3	.61
Miyar.	72	67	2	3					7.0	.10
Ajekar.	70	65		1	4				7.1	.10
Muniyal.	47	36		7	4				23.4	.50
Mutlapadi.	12	4		5	3				66.6	1.30
Mudradi.	52	40	3	7	2				23.0	.44
Hebri.	59	43	4	4	7	1			27.1	.62
Someshwar.	35	16		6	12	1			57.1	.90
Coondapoor.	281	281							-	
Basrur.	138	187		1					0.6	.01
Vondse.	17	12		1	3	1			30.0	.77
Karkunje.	33	31	1	1					6.0	.10
Chittoor.	31	17		2	11	1			45.0	1.30
Haladi.	60	56		1	2	1			5.0	.20
Sankaranarayana.	58	52		2	4				10.4	.26
Kamalashile.	45	18		6	12	9			60.0	1.80
Siddapur.	64	42		9	9	4			34.3	1.20
Hosangadi.	25	9		4	7	3	2		4.4	2.00
Baindur(Yedatore)	123	115	1	4	3				6.5	.10
Muryadi.	50	50							-	
Elijit.	17	10		7					41.1	.80
Golihalli.	9	5	4						44.4	.40
Kolluru.	28	8	2	4	12	1	1		71.3	2.00
Gangoli.	146	146							-	
Mangalore, t.k. (Bantval).	70	68	1	1					3.0	.05
Udipi	676	675		1					.2	.005
Malpe.	65	65							-	
Karaje(Hosur)	62	47	2	9	2		1	1	24.2	
Perdur.	87	75	7	5					13.9	

Appendix I (contd.)

Name of place.	No. of children examined for enlarged spleen.	No. with enlarged spleen. V_0	V_1	V_2	V_3	V_4	V_5	Spleen rate.	Average spleen.
Begrampalle.	57	50		3	4			12.2	.30
Bellarpadi.	18	15	1	1		1		16.6	.40
Kote.	54	53	1					2.0	.01
Katpadi (Mangudde village)	65	65							
Haladi.	47	38	1	4	2	1	1	19.1	.50
Kasaragod									
Adoor.	80	66	3	9		2		17.5	.40
Puttur									
Nidigallu.	45	36	6	1	2			20.0	.30
Total.	3538	3215	51	117	118	30	61	9.0	.22

Statement II

South Kanara District - Parasite findings.

Name of place.	No. of smears taken.	Number infected.	Parasite rate.	Species of parasites. M.T.	B.T.	Q.	Mixed.	Remarks.
Karkala.	30	..						
Mala.	27	..						
Nellikar.	15	..						
Miyar.	21	1	4.7	1r.				
Ajekar.	21	1	4.7			1 g.		
Muniyal.	18	3	16.6	3 r. (1rm.)				
Mutlapadi.	9	..						
Hebri.	31	2	6.4	2 r (1rm.)				
Someshwar.	33	..						
Coondapoor.								
Hondse.	9	..						
Chittur.	21	2	9.5		2 r.			
Haladi.	15	4	26.6	1 r. 1 cr.	1 g.	1 g.		
Sankaranarayana	18	3	16.6	1 rm.	1 rm.	1 r.		
Kamalashile	27	2	7.4		1 r	1 r.		
Siddapur.	38	3	8.0	2 cr.		1 r.		
Hosangadi	21	2	9.5	1 r.	1 r.			
Baindur.(Yedatore)	15	1	6.6	1 rm.				
Kolluru.	34	4	11.4	1 r.	1 r.	2 r.		
Udipi								
Karaje(Hosur)	31	5	16.1	4 r.	1 g.			
Perdur.	21	1	3.7			1 g.		
Byrampalle.	12	..						
Bellarpadi.	6	1	16.6			1 r.		
Kasaragod								
Adoor.	33	3	9.0	1 rm.	1 rm.	1 g.		
	506	38	7.5					

Note: R.--rings. rm.--many rings. g.--gametocyte. cr.--crescent.

Mode of work carried on in Mundaje village, Puttur taluk in connection with the prevention and cure of malaria.

Measures resorted to ------ Effects thereof.

1. The Special Malaria Officer who visited this area last year had set down the mode of work to be carried out. Though this could not be resorted to last year, it was decided to put these methods into operation this season.

2. The Taluk Board and the Government were approached for financial assistance, but unfortunately both the above were gracious enough to decline our request. But out of pure public spirit the leading gentleman of the village as well as the Taluk Board Member of this division, Mr. Narayana Bhat Bhide supplied the necessary stock of materials. These were obtained in January and we got the assistance of the District Health Officer in February. On his arrival the work was begun in right earnest.

3. On due consideration of the problem and the local circumstance, it was settled to take up the area which included the maximum number of the worst sort of breeding places for intensive work. Mr. Bhide supplied the workers with a party of 8 coolies which worked for 5 days. As much of obliteration work as was possible was carried on and mainly oiling of the marshy places was undertaken. The local boy scouts were of very great assistance as well as the Health Inspector of Beltangady with his personal staff. We take the opportunity of thanking them personally for their help while requesting the authorities to arrange to carry out those measures under their sole guidance and directions. The Health Officer was camping here for two days and was personally supervising and directing the work. He took unusually great pains to drive home the importance of such measures to the villagers.

4. The work of oiling was repeated every 10 days without fail. In this work the local scouts were of great assistance. I take the opportunity of thanking them here.

5. The next work in importance was the distribution of quinine. It is a fact that this year it was not done on last year's lines, but I am sure of more of quinine has been distri-

buted this year. This is mainly due to the people. I can say with confidence that the people have been convinced of the results of quinine, that it is the only sure remedy to cure malaria. Not only that much, but I am glad to note that people as a whole have begun to believe that quinine is also a sure preventive. Regular and systematic treatment of school children with appropriate doses of quinine has been very effective in preventing malarial attacks whereas in some cases its adminstration with mag. sulph. and such other necessary ingredients has even brought down the spleen rate in a wonderful manner. This method is worth following in not only schools, but in villages wholesale.

6. One more matter of importance is the running of a dispensary. It was opened in the beginning of January and is since working to the great benefit of the poor and the rich alike. The poor are given medicines free and the others are being charged for the medicines Enough if we say that it is run on the lines of the Rural Dispensary scheme. This has been started by the Dharmasamrakshani Sabha of Mangalore. But mainly it is financed up till now by Mr. Narayana Bhat Bhide. The Sabah under whose auspices the dispensary was started is not strong financially and but for Government assistance in the form of grant as in the rural dispensary scheme, the dispensary has not got bright prospects. The local people also should assist in this venture from a charitable view point.

7. As the effects of all these measures. I feel very happy to express my satisfaction in respect of the existence of malaria this season. There is nothing like the wonted outbreak and I am sure if these measures are tenaciously stuck up to, in a couple of years, this dire disease will surely be rooted out. It is only necessary to eliminate the malarial germs in the blood. It will be indeed ungrateful if I do not refer to the unique help that Mr. Narayana Bhat Bhide is extending in this village not only in this respect but mostly in almost all the various public activities which vitally effect the uplift of the village. It would be highly desirable if some more gentlemen come forward with such help all round to work up the amelioration of the village. This is a time when we have to help ourselves, rather than look out for outward assistance and die lingering in the absence any such.

8. I feel it my duty, as the Secretary of theCommittee for the

Prevention and cure of malaria to publish these facts and communicate these to those who foster a friendly feeling with us in our efforts.

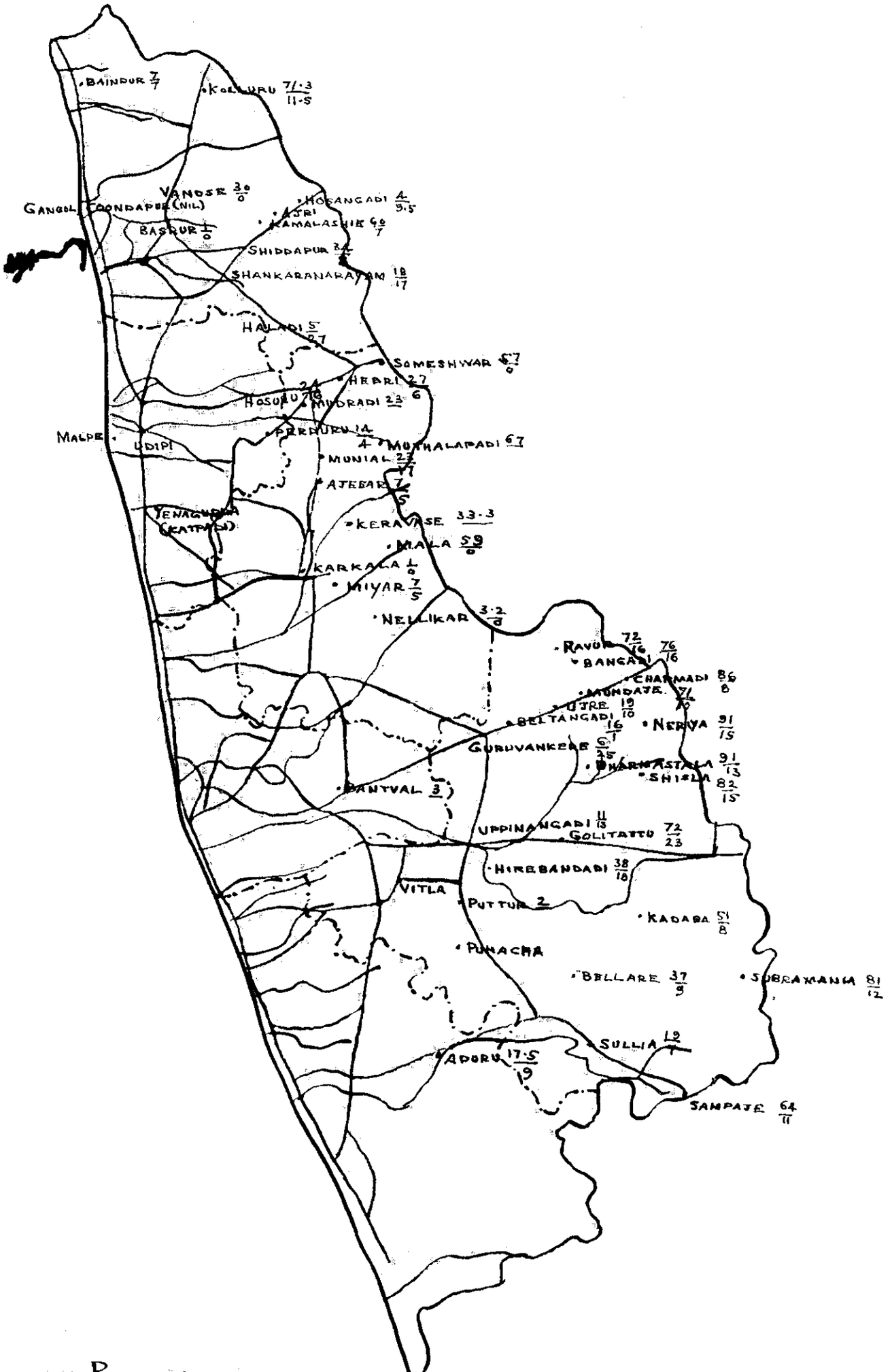
9. I would be failing in my duty if I do not urge it herein that it is the duty of the Government to do something more than the distribution of quinine in helping the poor subjects. At least I think, it is a matter of right to demand assistance from the Government at least in our case while we are trying to help ourselves.

10. Lastly I would urge it on the leaders in the different villages to start work on these lines and thus be free from such a powerful grip as is malaria's. This is one of the fundamental duties of the villagers if they want to exist. Some work can be done by the Co-operative Societies, at least by those that are working.

Mundaje.
20-4-30

Sd. M.N. Bhide,
Secretary, The Society for the Prevention and Cure of Malaria, M u n d a j e.

SPOT MAP OF MALARIA INCIDENCE — SOUTH KANARA DT



— REFERENCE

— PUTTUR TALUK SURVEYED IN DEC 1928 REST APRIL 1930

51 — SPLEEN RATE
8 — PARASITE RATE

River Payaswani near Adoor.

Mandale Hole.

Karmalathile with the river in flow

Rocky bed of the stream at Kolluru.

Pudibidge near Pandur.

Junction of the Netravati & Kumaradhari rivers.

Chief Secretariat
(C.I.B.)

T.M.

From

The Superintendent,

Chief Secretariat, (C.I.B.,)

To

The Manager,

Office of the D.P.H.

Will you kindly send urgently a copy of the report on malaria survey of South Kanara District sent as an enclosur to letter R.No. 276-1/Mal.,dated 31st July 1930, from the Director of Public Health ~~xxx~~ for communication to the P.D.B.,South Kanara.

A Copy has been sent direct to the P.D.B. S.Kanara.

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L.S.G.(P.H)-20-11-29

G.O. 27582 from the D.P.H. IR No. 276-1 Mal. of 31.7.30.

Subject

Malaria - South Kanara Dt. - Report on malaria Survey.

Pages 1-2 of G.O. ack (M) In May 1929 the D.P.H. recommended that the Special Malaria Officer might take up investigation work in the district of South Kanara as requested by Mr Karant, in Dec. 1929 or Jan 1930. In G.O. 1427 P.H. of 7.6.29 the Govt. approved the proposal of the D.P.H. The D.P.H. has

Pages 3-27 C.F. now forwarded a copy of the report on malaria Survey in the district carried out during April 1930. by the Special Malaria Officer. It is stated that the Survey was

para 12 p. 7 C.F. conducted under adverse conditions. As a result of the Survey conducted in the various villages of the dt. it is stated that malaria in general is not so bad or as highly

para 19 - p. 20 C.F. endemic in the taluks now investigated

as was found in Puttur taluk. As usual places close to the hills or in small valleys surrounded by forests are most malarious. whereas those in open country with few natural streams and springs of perennial nature are the least malarious. para 21 p. 21 CF.

7. As regards measures to control and mitigate the disease (for complete eradication is reported to be not possible). pp. 23-27 CF

it is the S.M.O says that there is not a single or isolated village or any specified area of land which can be exactly defined for applying suitable antimalarial measures. (1) As in the case of Anantapur, he suggests that a central organisation at the cost of Govt should be created for detailed carrying out detailed investigations of places and actually organising and supervising antimalarial operations. A on page 23 CF

(2) It is also recommended that the Dt and Taluk boards should provide extra staff, B on page 24 CF

tools and larvicides and (3) that the scheme of free distribution of quinine should be extended to the whole district. C on page 25 CF. D on page 25 CF.

(4) In addition opening of more rural or other dispensaries in the interior villages is also recommended. No details of cost of the measures recommended are given. The S.M.O

E on page 26 cf.

says that to achieve the purpose of this investigation, a three fold organisation suggested by him should be set up before any tangible result can be expected. To give effect to the above recommendations the D.P.H suggests that a conference of the P. D.B. and the P-T-Bs concerned (and ~~both~~ the S.P.O if necessary) may discuss the problem in all its aspects for inaugurating the measures at an early date.

p. 2 cf.

3. The Bd should appoint the central staff for detailed investigation and put up concrete proposals. If it applies for a grant in respect of these specific and approved proposals, the question may be considered. ~~In regards~~ As regards the extension of the scheme of free distribution of quinine, attention is invited to para 2 of Gro No 1043 P.H of 29.4.30. when the report of the D.P.H called for therein is received, the question of extending the scheme may be considered. Opening of dispensaries where required is a concern of the local boards concerned. The suggestion of the D.P.H for in regard to the conference of Pts of local boards may be commended to the P.D.B. The P.Ts may be requested to submit a report on the recommendations. of the action taken as arrived at the conference

Cf para 3 of Gro 1893 P.H (L) 1/8/30

(Z)

A draft order is sub^d for approval. If may
kindly be issued after perusal by Finance.
7.8.30

Sd/
11.8.30

Sd/
13/8

Sd/

by Sd/ No 27582-LE/
15/8/30

Finance (Exp)

The draft order may be
issued and the file returned to
L.S.G.

Sd/
22.8.30

SECRETARY TO GOVT.
18 AUG 1930
FINANCE DEPT.

Sd/
21.8.30.

L.S.G. u/o

C 25603 B
16.8.30

L.S.G (P.W) Dept

Sd/ No 25603 Exp
25.8.30.

No order may now issue.

Sd/
25.8.30

SECRETARY TO GOVERNMENT
25 AUG 1930
LOCAL SELF GOVERNMENT DEPARTMENT

31525

Sectt. II-5 (a)—50,006—5-11-29.

Hsg(P.II) DEPARTMENT.

	Date.	Initials.
When received for Fair-copying.		
When copied ..		
When examined ..		
When signed ..		
When despatched ..		

Subject

Malaria. South Kanara Dist.

Report on malaria Survey

orders passed

READ AGAIN G.O. No. ....., dated 19

" " " " ..... " 19

READ ALSO:—

C. No. 27582 From the D.P.H., No. 2761/P&L, dated 31/7/1930.

" " ..... " " ..... " 19

" " ..... " " ..... " 19

ORDER. by Mis

No. 2093 P.H. dated 2/8/30.

Copy already sent direct by D.P.H.

pages 3-27 C.F.

p 24 cf

not put up.

Read Order

1. A copy of the report on malaria Survey of the district of South Kanara is Communicated to the P.W.D.

2. As regards the recommendation of the S.M.O. in para 26 of the report the Govt. are not prepared to provide at their cost a malaria staff for a more detailed investigation in the district under Schedule V.I.A (6) of the Madras local Boards Act 1920, the

provision of the necessary staff is a legitimate charge on the funds of the DL-Bd ~~and~~, who should now arrange for its appointment when, on the recommendation of his Staff, the DL-Bd submits concrete proposals for dealing with the malaria problem in his district, the Govt will consider the question of giving the Bd a grant for carrying out the antimalarial works recommended. The grants will be made to approved and sanctioned works if and when funds permit, and when sanctioned will ordinarily not exceed one third of the cost.

cf para 3 of G.O. 1593 P.H
1/8/30

See para 2 of G.O. No 1373 P.H. 4-6-30 (J)

3/. ~~The~~ In regard to the suggestion to extend the scheme of free distribution of quinine to the whole district; the attention of ~~the~~ the P. Dr is invited to para 2 of G.O. No 1043 P.H of 29.4.1930. (Z)

and the Govt ~~are~~ The Govt are not prepared to reconsider their decision ~~now~~ at present.

4. ~~The~~ In forwarding the report of the S.P.O., the D P.H suggests that a conference of the P. Dr and the Pts of ~~the~~ latter boards concerned, may be

p-2cf

4

~~with the S.M.O.~~ and if necessary the S. M. O. also ~~if necessary~~,

may be convened for discussing the malaria problem in the district in all its aspects and for inaugurating anti-malarial operations at an early date. This Suggestion is Commended to the P. D. S. South Kanara. ~~He~~ is requested to ~~repor~~ Submit a report by 1st ~~Nov~~ Dec. 1930 of the action taken with reference to the above recommendations.

av
7/8/30

Asd
11.8.30

AD
13/8.

To The D.P.H ✓.
" P.D.B, S. Kanara
(4to)

Dpd. by Van
Dpt's. initials SK
Date 29/8/30
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